REMARKS

This is a full and timely response to the outstanding non-final Office action of March 16, 2006. Reconsideration and allowance of the application and presently pending claims are respectfully requested.

Applicants first wish to express their sincere appreciation for the time that Examiner Nguyen spent with Applicants' Attorney Heather Gorman during a telephone discussion on May 31, 2006 regarding the rejections of the claims over the reference to *Wang et al.*.

Present Status of Patent Application

Claims 1-23 are pending in the present application. Claims 11-23 are allowed, claims 7 and 10 are objected to, claims 1-2, 5, and 8 stand rejected under 35 U.S.C. §102(e), and claims 3, 4, 6, and 9 stand rejected under 35 U.S.C. §103(a). Applicants thank the Examiner for the indication that claims 11-23 are allowable and that claims 7 and 10 would be allowable if rewritten in independent form.

The prior art made of record has been considered, but is not believed to affect the patentability of the presently pending claims. Applicants believe that no new matter has been added and that a new search is not necessary.

Response To Claim Rejections Under 35 U.S.C. §102

Claims 1-2, 5, and 8 stand rejected under 35 U.S.C. §102(e) as allegedly being anticipated by *Wang et al.* (U.S. Publication No. 2004/0074869). Applicants respectfully traverse these rejections.

Claim 1 reads as follows:

1. A semiconductor process for controlling etching profile, comprising the steps of:

providing a plurality of substrates, wherein each substrate comprises a film to be etched and an overlying masking pattern layer thereon; and

successively etching the film to be etched on each substrate in a plasma chamber using the masking pattern layer as an etch mask, a polymer layer being deposited over the inner wall of the plasma chamber during the etching;

wherein an intermediary cleaning process is performed in the plasma chamber between the etchings ***before the deposited polymer layer reaches such a degree as to induce lateral etching on the film to be etched of the next substrate.***

(Emphasis added). Applicants traverse the rejection and assertions in the Office Action and submit that the rejection of claim 1 under 35 U.S.C. §102(e) should be withdrawn because *Wang* does not disclose, teach, or suggest at least the highlighted portions in claim 1 above. In particular, *Wang* fails to disclose performing a cleaning process before the polymer layer reaches such a degree as to induce lateral etching of the substrate. Instead, *Wang* primarily addresses the problem of a build-up of aluminum trifluoride (AlF_3) on the wafer being etched and on the chamber walls during plasma etching of aluminum substrates (see *e.g.*, paragraph 11).

In etching aluminum substrates, as in Wang, the primary problem is the AlF_3 buildup, which causes flaking that can contaminate the wafer surface. Thus, Wang teaches a fluorine-free process for etching aluminum substrates to reduce the AlF_3 buildup. Wang also teaches a cleaning step to remove any AlF_3 buildup that does occur on the chamber walls. However, there is no discussion of any lateral etching induced by any polymer buildup on chamber walls, and thus no teaching that the chamber should be

cleaned ***"before the deposited polymer layer reaches such a degree as to induce lateral etching on the film to be etched of the next substrate".***

In particular, paragraphs 38 and 40 of *Wang* (cited in the Office Action) are directed to a discussion of a thin polyethylene layer coating the ***sidewalls of the aluminum substrate*** (not the chamber walls). *Wang* teaches that this polyethylene layer is ***desirable*** and is created to provide a "protective carbon-based polymer" layer on the photoresist and the vertical walls of the aluminum substrate being etched (paragraph 38) to improve the etching profile (paragraph 40). In the fluorine-free integrated process for etching aluminum lines taught in *Wang*, the main etch uses a combination of BCl_3 and Cl_2 and a passivation gas including hydrocarbons, which are needed to create the protective carbon-based polymer on the walls of the vertical feature being etched in the aluminum (paragraph 38).

Wang does not disclose or teach that this protective polymer layer on the aluminum substrate sidewalls may induce lateral etching on the aluminum layer or any other layers of the substrate. Thus, the protective polymer layer disclosed in *Wang* is very different than the polymer layer of claim 1, which is an ***undesirable*** byproduct of the etching process, the claim being directed a cleaning process to reduce/remove the polymer layer before it causes the undesirable effect of lateral etching.

Since Wang does not teach, suggest, or even mention any lateral etching or any potential for lateral etching caused by any polymer layer, Wang also cannot teach or suggest a cleaning process perfomed ***before the deposited polymer layer reaches such a degree as to induce lateral etching on the film to be etched of the next substrate.***

Therefore, Applicants respectfully request that the rejection of claim 1 be withdrawn and that claim 1 be placed in condition for allowance.

In addition, claims 2-10 are believed to be allowable for at least the reason that these claim depend from allowable independent claim 1. *In re Fine, Minnesota Mining and Mfg.Co. v. Chemque, Inc.*, 303 F.3d 1294, 1299 (Fed. Cir. 2002).

Response To Claim Rejections Under 35 U.S.C. §103(a)

Claim 4 stands rejected under 35 U.S.C. §103(a) as obvious over *Wang et al.* in view of *Qian et al.* (U.S. Patent No. 5,599,399). However, Applicants respectfully submit that claim 4 is not rendered obvious by *Qian*, because *Qian* fails to remedy the deficiencies of *Wang*. In other words, the combination of *Wang* and *Qian* does not teach or reasonably suggest at least the features/limitations emphasized above in claim 1 as lacking in *Wang*. Therefore, the rejection of claim 4 should be withdrawn.

Claims 3, 6, and 9 also stand rejected under 35 U.S.C. §103(a) as obvious over *Wang et al.* in view of *Zhong et al.* (U.S. Patent No. 6,124,927). Applicants respectfully traverse the rejection.

Applicants respectfully assert that the combination of *Wang* and *Zhong* does not teach or reasonably suggest at least the features/limitations emphasized above in claim 1 as lacking in *Wang,* in particular that a cleaning process is performed ***before the deposited polymer layer reaches such a degree as to induce lateral etching on the film to be etched of the next substrate***. Thus, *Zhong* does not remedy the deficiencies of *Wang*.

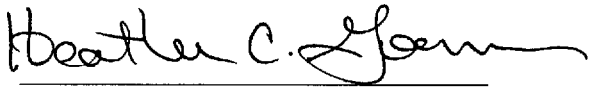
Furthermore, these claims recite other features that can serve as an independent basis for patentability that are not taught or suggested by *Wang* or *Zhong*, alone or in combination. In particular, *Wang* and/or *Zhong* do not teach monitoring optical emission spectra to ***start*** cleaning ***before the polymer layer builds up to a point to induce lateral etching***. *Zhong* is primarily directed to using monitoring of optical emission of the plasma to determine when a cleaning process should be terminated in order to prevent the cleaning process from etching away portions of the chamber walls. Moreover, *Zhong* does not teach or suggest starting cleaning ***before*** the spectral intensity associated with the layer to be etched from OES data analysis reaches more than 100 at a wavelength of about 405 nm (the wavelength corresponding to silicon).

Therefore, Applicants respectfully submit that the rejection of claims 3, 6, and 9 should be withdrawn.

CONCLUSION

In light of the foregoing amendments and for at least the reasons set forth above, Applicants respectfully submit that all rejections have been traversed, rendered moot, and/or accommodated, and that the now pending claims 1-3 and 5-14 are in condition for allowance. Favorable reconsideration and allowance of the present application and all pending claims are hereby courteously requested. If, in the opinion of the Examiner, a telephone conference would expedite the examination of this matter, the Examiner is invited to call the undersigned agent at (770) 933-9500.

Respectfully submitted,



Heather C. Gorman, Reg. No. 42,389

THOMAS, KAYDEN, HORSTEMEYER & RISLEY, L.L.P.
Suite 1750
100 Galleria Parkway N.W.
Atlanta, Georgia 30339
(770) 933-9500